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Learning ESL Vocabulary with Smartphones

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Abstract

This study investigated the effectiveness of smartphones on helping ESL college students learn English vocabulary. A JAVA application (Word Learning) software program containing 852 English words, of each word in a graphic diagram with seven features which are spelling, pronunciation, meaning in the Chinese language, synonym, antonym, part of speech and using it in example sentences, was designed by the researcher. 50 students were equally divided into experimental group and control group. A pre-test and post-test were administered to assess the impacts. The results of the study revealed that the students receiving treatment in the experimental group outperformed those in the control group significantly. This article is also to introduce a research design and/or set up a pedagogical example, which might be followed.

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Keywords: Vocabulary acquisition, ESL, smartphone, mobile assisted language learning;

1. Introduction

Hypertexts are electronic texts that readers can access in a multi-facets way by applying hyperlinks. Gloss is defined as any kind of attempts to supply what is perceived as to be deficient in a reader's procedural or declarative knowledge, gloss can take the form of verbal, visual (image, icon, video), and/or audio. Hypertext linked with gloss can help readers possess control, immediate access, and no interruptions in the reading process (Davis & Lyman-Hager, 1997). Researches have displayed that combining multiple forms of media such as text, voice, pictures, animated pictures, and video can aid vocabulary learning and facilitate reading comprehension (Chun & Plass, 1996, 1997; Lomicka, 1998).

Graphic organizers are the theoretical construct that the visual, audio and verbal organizational structure of the

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diagram consolidates information into a meaningful whole (Horton, Lovitt & Bergerud, 1990). Thus, learners will not experience the impression that they are being taught a series of unrelated terms, facts, or concepts. Kang (2004) defines a graphic organizer as a creative technique used to present complex information and converts it into a simple and meaningful graphic or diagram display of the relationships between concepts. Students, on the one hand, can use graphic organizer as a learning tool to better understand vocabulary meanings and then assess or review, for a test, any new vocabulary items learned in a subject area. Teachers, on the other hand, can use graphic organizer prior, during or following teaching a topic to organize the notions taught. Suitable graphic organizers can be designed or chosen by teachers alone, students alone, or both, to teach or learn a certain set of vocabulary. Horton et al. (1990) and Mercuri (2010) confirm that graphic organizers are powerful; they can be part of a supportive classroom environment and integrative instruction; and they are easy to implement tools that allow teachers to examine students' learning on a particular topic, assess on-going learning, and design and modify instruction to meet students' needs.

A smartphone is built on a mobile operating system, with more advanced computing capability and connectivity than a regular phone. The early smartphones combined the functions of a personal digital assistant (PDA) with a mobile phone. Recent models added the functionality of portable media players, high-resolution touch screens and web browsers that display standard web pages.

The effectiveness of learning via mobile phones, it has been investigated by Thornton and Houser (2005) in Japan, Lu (2008) in Taiwan, Cavus and Ibrahim (2009) in Turkey and Hayati et al. (2011) in Iran. Their researches concluded mixed results, however, all their experimental designs applied to send small learning materials of a few vocabulary items via short message service (SMS). The obvious deficiency in SMS is only very short message can be delivered; even mobile carriers allow to send a large file for free, no learners will have enough patience to scroll down a small screen and keypad to study for long time. Another deficiency is that learners passively learn; they do not have an option to select what to learn or not to learn if they have mastered part of the received contents.

This article conducted research which was designed with principle of intentional learning, applied large user-command output comparable to gloss with hypertexts, illustrated information in a graphic organizer diagram display, and involved ESL learners to study actively via smartphones. The author believes that her design solved the deficiencies existing in above SMS researches.

The present study aims to:

- explore effectiveness of using smartphones in learning English vocabulary.
- introduce a pedagogical example of designing intelligent teaching application by author herself.

2. Methods

2.1. Participants

50 participants were sophomore college students in one class at Jiujiang University of China. The range in age of participants was 20-23. Randomly divided, 25 students were in experimental group and 25 students in control group. Participants were administered vocabulary tests of pre-test at the beginning of semester, immediate post-test as part of semester final examination.

2.2. Materials

The material taught to students in both experimental and control groups included all the vocabulary items of their textbook units needed for passing their course. Exactly 852 vocabulary items, which were listed in a glossary appendix section in their textbook, *New Horizon College English: Reading and Writing,* book 3, 2nd edition, were available for each student to review, study and use during the experiment. Students of both groups were recommended to study vocabulary items on daily basis. The research lasted for one full semester with four regular class hours per week.

2.3. Word Learning Application Software Design

In preparation, all 852 words were compiled into an applicable computer database with seven features; namely, spelling, pronunciation, meaning in the Chinese language, synonym, antonym, part of speech and using it in example sentences (some words do not have synonym and/or antonym). With these focal features, the author, with help from her college junior niece, designed JAVA application software with touch screen commands, called Word Learning (visit author's personal blog site http://perry20008.blog.sohu.com). Students in experiment group were instructed to download it to their smartphones and taught how to use it. Students with no smartphones borrowed smartphones from friends and/or classmates to fulfil the experiment.

2.4. Functions of Word Learning Application

The Word Learning software has following commands to perform tasks.

1. Search command. To search a word from its 852 words database.
2. Glossary command. The 852 words are listed alphabetically with each word occupies a full scroll down screen. The first word is *abandon*.
3. Speaker Command. The speaker command is positioned immediate next to the word. If the speaker symbol is touched, American pronunciation of the word will be broadcasted.
4. Add command is next to Speaker command. Users can add a word into Unknown Words database if they believe that they have not mastered the word yet.
5. Previous Command. Users can go back to re-learn the previous word.
6. Next Command. Go to next word.
7. Unknown Words command. Unknown Words is a collection of words that a user has added by using Add command. Therefore, a user does not need to open all 852 words Glossary command when he/she performs memorizing; users have the option to clear Unknown Words database and resume recording.
8. Sample Test command. Sample Test performs model tests. Users can randomly select a number of words (1 – 852) to examine how much they have learned.
9. Exit command. Exit the application.

2.5. Study Design

Students in both groups were instructed all the 852 vocabulary items and their meanings in the first language and Chinese as they appear in the different units and in the glossary appendix during classes. All 50 students were also asked to study those items outside class sessions. Additionally, they were encouraged to use English-Chinese dictionaries for better understanding or memorizing if they believe it helps. They were permitted to ask and consult the researcher about the meaning of any item at anytime. The research spanned the full fall semester of 2012-2013 academic year.

The only difference is that all students in experimental group can study and be recommended to study these 852 words with their smartphones. Students in control group had no access to Wording Learning software even they had smartphones.

2.6. Pre-test and Post-test

There are 6,674 English words in the glossary section of book *College English Curriculum Requirements*, administered by the Chinese Ministry of Education. Through a computer program, random selections were performed to extract 100 words to form pre-test to evaluate the vocabulary knowledge of both groups. Examinees were asked to write down the common Chinese meaning during the tests; one point was awarded if correct Chinese meaning or interpretation was answered. 100 words were also randomly selected from the 852 appendix glossary to perform the post-test.

3. Results

3.1. Comparison of exp. group and cont. group before treatment (pretest).

The mean of experimental group pretest score is 42.92 (SD = 11.82, Std. EM = 2.23), the mean of control group pretest score is 43.56 (SD = 11.41, Std. EM = 2.28). At Levene's test, f = .726, Sig. is .384, greater than 0.05, equality of variances is accepted; at the t-test section, t = .364, Sig. (2) is .701, larger than 0.05, which indicates that there is no significant difference between the mean scores of experimental group and control group before treatment.

3.2. Comparison of exp. group and cont. group after treatment (posttest).

Table 1. Descriptive Group Statistics

Score	N	Mean	Std. Deviation	Std. Error Mean
posttest exp. group	25	74.04	12.408	2.482
cont. group	25	44.60	10.618	2.124

Table 2. Independent Samples Test

	L. Test		t-test for Equality of Means						
	F	Sig.	t	df	Sig.(2)	MD	Std ED	95% Conf.	
								Lower	Upper
EVA	.786	.380	9.013	48	.000	29.440	3.266	22.873	36.007
EVNA			9.013	46.881	.000	29.440	3.266	22.869	36.011

Note: L. Test = Levene's Test for Equality of Variances, EVA = Equal Variance Assumed, EVNA = Equal Variance not Assumed, Sig. (2) = Sig. (two tailed), MD = Mean Difference, Std ED = Standard Error Difference, 95% Conf. = 95% Confidence Interval of the Difference.

After treatment, exp. group has a 74.04 mean score, the mean of cont. group is 44.60, the difference is significant (sig. (2) = .000).

4. Discussion

The results (table 1 and 2) showed that the experimental group students had higher scores in vocabulary acquisition post-test although the experiment was a randomized controlled trial. The difference is significant. If we consider that all 50 students were taught in the same class, the only difference was that students in experimental group had smartphones with downloaded Word Learning application; the advantage of using smartphones to learn English vocabulary is fully displayed. The higher score could be attributed to four reasons. First, providing students in experimental group with direct and explicit content diagram of each word might have enabled them to improve their vocabulary repertoire in terms of the learned features of each vocabulary item. In other words, students learned all seven features together for each vocabulary item they came across; that is, its spelling, pronunciation, meaning in Chinese, synonym, antonym, part of speech and using it in example sentences. The second reason might be the use of smartphones to teach vocabulary items. This strategy might have enabled students in experimental group to visually see all learning features as important parts of the single vocabulary item that they were trying to learn. This reason is justified by the concept that today's students are better visual learners who have grown up on using video games, computers and mobile phones to obtain new information. The third reason could be the Word Learning software, which incorporates functions of Unknown Words and Sample Test. Unknown Words helps users locate what they need to learn, Sample Test assists learners to investigate their study performance. The forth reason for the higher score of the experimental group students might be the length of the study which lasted for one full academic semester. In such a long period of time, students in experimental group probably spent longer accumulated time on learning these 852 vocabularies because of the convenient presence of smartphones; while, because of the inconvenience of carrying textbooks, students in control group might spend less time on studying. As the semester went on, the researcher noticed that students in experimental group were becoming better autonomous learners.

Compared to studies (Thornton & Houser, 2005; Lu, 2008; Cavus & Ibrahim, 2009; Hayati et al., 2011) of sending SMS texts, the superiority of Word Learning is fully demonstrated. Firstly, the technological restraint limited their studies to send small content, i.e. 14 words in one week (Lu, 2008), its broad practical application should be questioned; whereas Word Learning, containing 852 words, is a 6.28 MB application file, it is incorporated into regular syllabi. Secondly, Wording Learning is designed for users to learn at anytime, find out what have learned or have not, and examine performance with sample tests; on the other side, learners in their studies could do nothing but to wait passively for SMS messages, of which punctual delivery and receiving are unknown.

The pedagogical implication of this study is for textbook writers or publishing houses to include files downloadable to smartphones. This is especially true when designing educational corpuses in technical fields where learners must understand many specific terms and the underlying meanings to successfully execute field job tasks and work safely in carrying out their professional responsibilities, that is, in case of uncertainty, with smartphones in pockets, performers are more likely to pull out their smartphones to search for solution than risk dangerous attempt. For teachers, if a downloadable file is not accompanied with textbook and designing a complete application is an insurmountable challenge, teachers may want to simply make a .doc or PDF file for students to copy/paste into their smartphones.

The author considers that the design of Word Learning was a small task. Her superficial knowledge of computer sciences, helped by her niece who is a college junior student with computer sciences major, made it executable. It is simple JAVA interfaces were designed by the author, an English teacher with a JAVA manual (the author downloaded it from Internet); her niece, a college junior student, linked its unsophisticated database configuration. The time consuming part was the repetitive work to collect the data of all seven features of these 852 words, the author resorted to copy, paste and then compile. She knows there are abundant software geeks who can easily write a small program to crawl online dictionaries to extract the information. To conclude, the author believes that most teachers can make their own mobile teaching/learning materials in a similar design. The intention of this article is to introduce a research direction and/or set up a pedagogical example, which might be followed.

The limitation of this study is the assessment of participants' vocabulary learning, measured only at the recognition level. A combination of multiple-choice items, along with recognition and production vocabulary test might have yielded different outcomes for the vocabulary post-test. Another improvement should be done is to upgrade the Word Learning software, the author discovered the absence of a function to communicate with users, instead, the author sent communications by SMS during experiment. Another function might be needed is update, it is a requisite to run live class. The author is learning computer languages and trying to add more features to design a better version with more functions. This research presents a neonatal idea to invite further scrutiny.

5. Conclusion

This article introduced a pedagogical example of ESL students actively using smartphones to learn English vocabulary. The results of the study revealed that the use of smartphones is a very effective technique in building vocabulary for Chinese university EFL students. It also exhibited that the use of smartphones achieved successful growth in these students' vocabulary acquisition over time. Yet, further research area of interest may be replicating this study with an increase in the sample size for an extended period of time, or replicating it with other sample types of students such as high school students, struggling students, disabled students in addition to male students as opposed to female students, or children as opposed to adults. Also, more research should be conducted in applying other gadgets.

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